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that time by Captain Burton, from which the date of his invention can be inferred, is Captain Warren's letter, page 103, from which it may be concluded that Captain Burton's plan was tried on board the Seringapatam, some time previous to April, 1821. It, however, appears, from subsequent inquiry, that a Navy Board order, dated July 29, 1820, was addressed to the officers of Chatham-yard, directing them to fit Captain Burton's cat-head stopper on board the Forte.

No. VII.

SHOT CARTRIDGE.

The sum of FIFTEEN GUINEAS was this session presented to Mr. JOSHUA JENOUR, Jun. 31, William-street, Hampstead-road, for his Shot Cartridge. The following communication has been received from the candidate, and the punch for making the cartridge cases, as well as specimens of the cartridges themselves, have been placed in the Society's repository.

31, William-street, Hampstead-road,

SIR,

November 2, 1825.

GIVE me leave to offer to the notice of the Society of Arts an invention of mine, for the purpose of shooting at much greater distances than can be accomplished in the present way of charging guns, consisting in a sort of shot-cartridge, constructed upon a new principle, totally different from any thing of the kind hitherto used, and

equally, I presume, applicable to military as to sporting purposes. Mr. Joseph Egg, gun-maker, No. 1, Piccadilly, has witnessed shots made at seventy, eighty, and a hundred yards distance, equal in strength and closeness to shots generally made at forty yards with a fowling-piece. I shall be happy to make experiments before any members of the Society, and to communicate the invention, with specimens, &c.

I am, Sir,

A. Aikin, Esq.

Secretary, &c. &c.

&c. &c. &c.

JOSHUA JENOUR, Jun.

The unwinding of a cord or twine, a chain or wire, from a spiral groove infolding the charge of shot, constitutes the chief principle, by means of which they are thrown from the gun in a mass, and dispersed at various distances. Two or more pieces of metal are so constructed, as when bound together by the twine, &c., to form a cylindrical case, inclosing the charge of shot, corresponding to the size of the gun, and having a regular spiral groove from end to end, similar to a common screw. One end of the twine is made fast, and the other is left free, to be unwound by the resistance of the air acting upon it during the passage of the cartridge. The unwinding of the twine being completed, the centrifugal force occasioned thereby opens the case and liberates the contents. One of the subordinate points of construction is that of filling the interstices of the charge with fine sand, or other matter, either mixed or not with tallow, in order to prevent the fired powder from penetrating into and deranging the

construction of the cartridge; and also for the purpose of preserving the spherical form of the shot, whereby the penetrating force is increased.

The experiments which I have individually made, in a very imperfect manner, under every disadvantage, may be considered as merely amounting to a discovery of the important principle here described. Various trials upon an extensive scale are evidently required, in order to fix the minute particulars of construction for cartridges, to break uniformly at various given distances; as the quality and substance of the metal, the size of the grooves, and the number of turns, the quality and size of the binding-cord, the exact adjustment of its loose end, so that it be uniformly acted upon by the air in its passage from the gun, the general and nice uniformity of sizes, weights, &c., of cartridges for each particular distance; with other minute practical points requisite to attain a general uniformity of construction, and a consequent certainty of effect.

Numerous, accurate, and systematic experiments would, I have no doubt, ultimately lead to the production of cartridges highly complete, to shoot close and strong with a fowling-piece at any required distance, to the extent of several hundred yards.

The following data are collected from the experiments which I have made. The distance to which the shot are conveyed in a body is to be regulated by the number of turns or length of the binding; also by the specific gravity, the texture and the size of it, and by the charge of powder.

The shorter the binding the less will be the distance to which the shot are conveyed in a body, and *vice versa*. The case should be of the least possible weight, to possess

sufficient strength to resist any compression by the action of the discharge, and should retain the whole of its contents until the last turn of the binding is unwound.

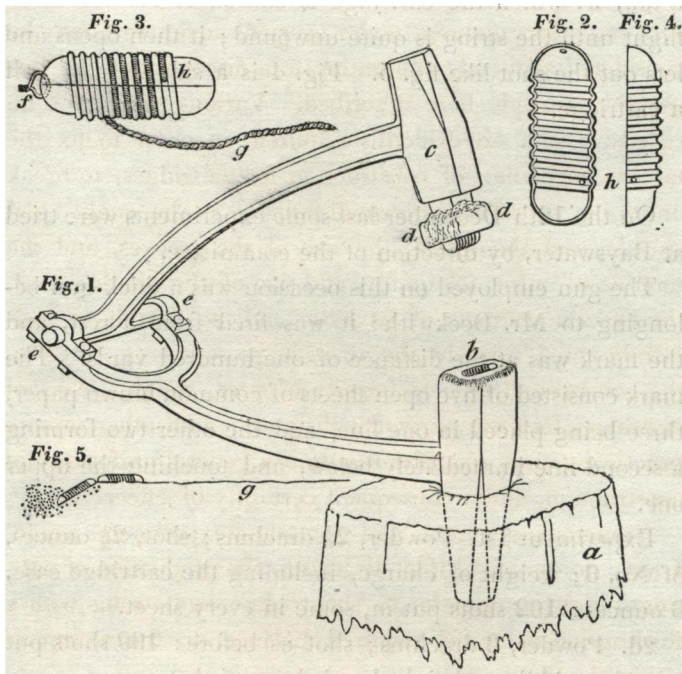


Fig. 1 the mould fixed in the block *a*; *b* the hollow which gives shape to half a cartridge; *c* the hammer or punch, the nose of which is covered with lead *dd* cast in the mould, and on it at the same time; *ee* the joint. Fig. 2 an inside view of a half cartridge, made of copper sheet (half the real size); it serves also to represent the hollow of the mould, which is worked like a screw, so that when two of these shells are tied together with string or copper wire, through two holes at *f*, fig. 3, they form one

continuous spiral, along which the string g is wound; h a hole, through which one end of the string is secured by a knot on the inside: the end of this string g is left loose as a tail, by which the cartridge is caused to revolve in its flight until the string is quite unwound; it then opens and lets out the shot like fig. 5. Fig. 4 is a side view of half a cartridge.

On the 12th December last some experiments were tried at Bayswater, by direction of the committee.

The gun employed on this occasion was a duck-gun belonging to Mr. Beckwith; it was fired from a rest, and the mark was at the distance of one hundred yards. The mark consisted of five open sheets of common brown paper, three being placed in one line, and the other two forming a second line immediately below, and touching the upper one.

Experiment 1st. Powder, $2\frac{1}{2}$ drachms; shot, $2\frac{1}{2}$ ounces, of No. 6; weight of charge, including the cartridge case, 3 ounces: 102 shots put in, some in every sheet.

2d. Powder, 3 drachms; shot as before: 199 shots put into the middle and right hand sheet of the upper row.

3d. Charge as before, except that the shot was No. 2, and the cartridge, which in the former trials had been bound with thin twine, was in this bound with whipcord: 14 shots put into the middle sheet of the upper row.

4th. Charge as before: 19 shots put into the right hand sheet of the upper row.

The following experiments were made with slugs:—

5th. Powder, 3 drachms; slugs 33, weighing $2\frac{1}{2}$ ounces: 14 were put into a target four feet square.

6th. Charge as before : 10 slugs put in.

7th, 8th, 9th, and 10th. Charge as before, but omitting the cartridge : 2, 3, 5, and 12 shots were respectively put into the target.

In the above experiments most of the slugs, and even some of the shot, pierced through twenty-five folds of brown paper.

The Society are of opinion that Mr. Jenour's cartridge possesses the merits of novelty, ingenuity, and probable utility, especially for wild-fowl shooting. They are aware that many experiments remain to be tried, in order to ascertain the precision of which the invention is capable, and will be glad to receive farther information on this subject.

No. VIII.

VALVE AND STAND-PIPE FOR WATER-MAINS.

The sum of FIVE GUINEAS was this session presented to Mr. DAVID MAGSON, 26, Harp-alley, Fleet-street, for a Valve and Stand-pipe for Water Mains; models of which have been placed in the Society's repository.

GENTLEMEN,

I VERY respectfully beg to call your attention to an invention which I conceive must eventually prove of great public utility, but more especially to the interests of the